

DISCUSSION OF THE AMENDMENT

Claims 1-23 are pending.

Claims 1-2 are canceled without prejudice.

Claim 24 is added. Support for Claim 24 is found in original Claim 3 and page 7, line 15 – page 8, line 1 of the specification.

Claim 3 is amended.

Support for this amendment is found on page 7, line 20 – page 8, line 19.

No new matter is believed to be added upon entry of the amendment.

Upon entry of the amendment, Claims 3-24 will be active.

REMARKS

Applicants thank Examiner Owens for conducting the kind and courteous discussion with Applicants' representative, Daniel R. Evans, on July 27, 2005. The content of the discussion is reflected in the amendments to the claims and the following remarks.

The rejection of Claims 1-23 under 35 U.S.C. § 103(a) over the disclosures of CA 135:363159 and CA 124:282468 is respectfully traversed.

It is noted that CA 135:363159 and CA 124:282468 are the Chemical Abstract generated Abstracts for JP 2001-327866 (JP '866) and JP 2001-096153 (JP '153), respectively. Applicants have attached copies of machine-generated English translations of both JP '866 and JP '153; wherein pinpoint citations contained herein refer to the attached copies.

Upon entry of the amendment, Claims 1-2 are canceled. Cancellation of these claims renders the rejection of the same moot. Thus, the issue to resolve is whether the disclosures of JP '866 and JP '153, either separately or in combination, suggest the processes claimed in Claims 3 – 24.

Applicants note that neither JP '866 nor JP '153 suggest the presently claimed processes for producing a glycidyl ether adduct. These two disclosures may broadly suggest an alkylene oxide addition reaction using a mixed metal oxide catalyst (see Titles and Abstracts). However, close inspection of these disclosures show that an alkylene oxide is either ethylene oxide or propylene oxides and **not** a glycidyl ether. The Examiner's attention is directed to the disclosures of JP '866 and JP '153, in which ethylene and propylene oxides are the alkylene oxides to which these disclosures refer (JP '866: see page 6, ¶ 16; page 7, ¶ 20; and page 9, ¶ 34 and JP '153: page 6, ¶ 16; page 7, ¶ 20; and page 8, ¶ 23).

A reason why neither JP '866 nor JP '153 do not suggest employing a catalyst comprising a complex oxide of magnesium and at least one element other than magnesium

selected from the group consisting of the elements in the third period and the fourth period in the periodic table for a process for producing a glycidyl ether adduct is because NaOH is conventionally used as the catalyst for these types of processes. In this regard, the Examiner's attention is directed to the data presented in Table 1 (pages 15-16). An abbreviated version of Table 1 appears below.

Ex.	Cat ^a	Reactants		Reaction Conditions			Composition (GC area %)				Select. ^j
		(a) ^b	(b) ^c	MR ^d	RT ^e	T(°C)	AOC ^f	(1) ^g	(2) ^h	(3) ⁱ	
1	1	I	A	0.83	6	170	14.9	62.1	17.5	1.4	76.7%
2	2	I	A	0.83	6	170	16.1	58.4	20.0	3.6	71.2%
3	3	I	A	0.83	6	170	15.9	58.9	19.3	1.8	73.6%
4	4	I	A	0.83	5	170	16.7	59.4	19.0	1.8	74.1%
5	2	I	B	0.83	9	175	31.1	41.3	12.1	1.8	74.8%
6	2	G	A	0.83	6	150	23.6	53.3	16.6	1.9	74.2%
7	2	H	A	0.83	4	180	22.0	54.2	19.7	2.4	71.0%
8	2	J	A	0.83	20	150	14.9	51.1	17.0	2.3	72.6%
9	2	I	C	0.67	66	160	18.7	67.3	1.7	0.3	97.1%
CE1	NaOH	I	A	0.83	5	180	22.1	43.5	25.3	7.1	57.3%

^aCat. Catalyst; 1: Mg₆Al₂(OH)₁₆CO₃·4H₂O; 2: Mg_{0.7}Al_{0.3}O_{1.15}; 3: 5MgO·Al₂O₃·mH₂O; 4: [(Zn_{0.25}Mg_{0.75})_{5/7}Al_{2/7}(OH)₂](CO₃)_{1/7}·cH₂O].

^b(a) glycidyl ether;

G: butyl glycidyl ether

H: phenyl glycidyl ether

I: 2-ethylhexyl glycidyl ether

J: decyl glycidyl ether

^c(b) Active hydrogen-containing organic compound

A: glycerin

B: diglycerin

C: 2,2-dimethyl-1,3-dioxolane-4-methanol (acetone ketal of glycerin)

^dMR Mole ratio (a)/(b).

^eRT Reaction time (hour).

^fAOC GC area % of Active hydrogen-containing organic compound

^g(1) GC area % of monoether product (1).

^h(2) GC area % of diether product (2).

ⁱ(3) GC area % of triether product (3).

^jSelect.
$$\frac{(1)}{[(1) + (2) + (3)]}$$

The Examiner's attention is directed to the selectivity data for Examples 1-9 when compared to Comparative Example 1. In particular, the Examiner should compare the selectivity values of Example 4 and Comparative Example 1, in which the only difference is the form of the

catalyst. In the former the observed selectivity is 74.1%, while in the latter the observed selectivity is 57.3%. This is an improvement in selectivity by 16.8%. This means that the purity of the crude product is higher, and less time is required to purify the monoether adduct.

This aspect is also seen by inspecting the data in Tables 2 (pp. 19-20) and 3 (pp. 22-23). The data in Table 2 shows that when the mole ratio of the glycidyl ether to active hydrogen containing organic compound is increased, high selectivities for the diether adduct were realized. Thus, in Example 10, a selectivity of 86.6% was observed for the diether adduct (*cf.* diether adduct selectivity of 41.4% when catalyst was NaOH). The data in Table 3 confirm the high selectivity values that can be realized when employing the claimed process.

It is noted that claimed processes for producing a glycidyl ether adduct (Claims 3-24) have many attendant advantages. This aspect is appropriately summarized on page 24 of the Specification, which reads as follows:

In an addition reaction between an active hydrogen-containing organic compound and a glycidyl ether, use of the preferred catalyst of the present invention enables inhibition of an excess addition reaction of glycidyl ether which is a successive reaction, and a mono- or di(alkyl, alkenyl or phenyl) ether product in which one or two glycidyl ethers are added is selectively obtained by adjusting the mole ratio of the active hydrogen-containing organic compound to the glycidyl ether to fall in a specific range. That is, a mono- or di-(alkyl, alkenyl or phenyl) ether product can be obtained at a high productivity with a high purity.

In view of all of these considerations, it is believed that the present invention is unobvious over the disclosures of JP '866 and JP '153. It is kindly requested that the Examiner acknowledge the same and withdraw these rejections.

The rejection of Claims 1-23 under 35 U.S.C. § 112, first paragraph, is believed to be obviated by amendment.

Amended Claim 3 is as follows:

A process for producing a glycidyl ether adduct, which comprises:
subjecting an active hydrogen-containing organic compound and a glycidyl ether to an addition reaction in the presence of a catalyst comprising a complex oxide of magnesium and at least one element other than magnesium selected from the group consisting of the elements in the third period and the fourth period in the periodic table;

wherein the active hydrogen-containing compound is selected from the group consisting of a monool, a diol, a polyol, a thiol, a carboxylic acid, an amine, an amide, and mixtures thereof.

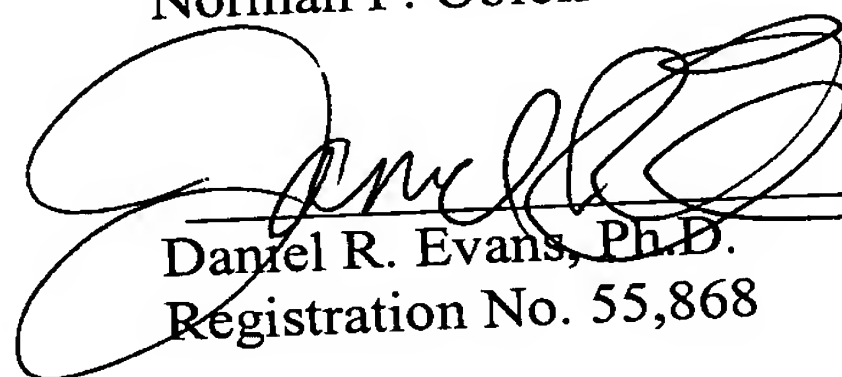
Support for this amendment is found on page 7, line 20 – page 8, line 19.

It is respectfully requested that the Examiner withdraw this rejection.

In view of the amendments to the claims, the evidence contained in the Specification, and the comments contained herewith, it is believed that the present application is in a condition for allowance. Should the Examiner deem that a personal or telephonic interview would be helpful in advancing this application toward allowance, she is encouraged to contact Applicants' undersigned representative at the below-listed telephone number.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon



Daniel R. Evans, Ph.D.
Registration No. 55,868

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413-2220
(OSMMN 06/04)